

CLAIMS

What is claimed is:

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1 1. *An apparatus comprising:*
2 *at least one wireless transceiver to transmit and receive signals in*
3 *accordance with a first and a second protocol to and from first and second network*
4 *devices of a first and a second wireless network communicatively coupled to the*
5 *apparatus; and*
6 *at least one controller manager coupled to said at least one wireless*
7 *transceiver to operate said at least one wireless transceiver to perform said*
8 *transmits and receives in accordance with said first and second protocols in a*
9 *coordinated manner, taking into consideration quality of service criteria to be*
10 *achieved for the respective protocols.*

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1 2. *The apparatus of claim 1, wherein said at least one controller manager is*
2 *equipped with logic to determine message types of first messages to be transmitted*
3 *to a selected one or selected ones of said first network devices in accordance with*
4 *said first protocol, and to give priority to said first messages over second messages*
5 *to be transmitted to a selected one or selected ones of said second network devices*
6 *in accordance with said second protocol, if message types of said first messages*
7 *are determined of a multi-media type.*

1 3. *The apparatus of claim 1, wherein said at least one controller manager is*
2 *equipped with logic to maintain a quality metric reflective of frequency of error for*
3 *each voice stream, and to make its priority determination for messages competing to*

4 be transmitted to said first and second network devices in accordance with said first
5 and second protocols in view of said quality metric maintained for each voice
6 stream.

1 4. *The apparatus of claim 3, wherein said at least one controller manager is*
2 *equipped with logic to increment a message transmitted counter corresponding to a*
3 *voice stream whenever a message is transmitted for the voice stream, and not*
4 *dropping a message of the voice stream until at least m messages have been*
5 *successfully transmitted consecutively for the voice stream, where m is greater than*
6 *1/e, and e is an error percentage rate not to be exceeded.*

1 5. *The apparatus of claim 4, wherein said at least one controller manager is*
2 *further equipped with logic to reset a message transmitted counter corresponding to*
3 *a voice stream when a message of the voice stream is dropped after at least m*
4 *messages have been successfully transmitted consecutively for the voice stream.*

1 6. *The apparatus of claim 3, wherein said at least one controller manager is*
2 *equipped with logic to increment a message transmitted counter corresponding to a*
3 *voice stream whenever a message is transmitted for the voice stream in accordance*
4 *with said first protocol, and not dropping a message of the voice stream in favor of a*
5 *message of a first message type to be transmitted in accordance with said second*
6 *protocol until at least m₁ messages have been successfully transmitted*
7 *consecutively for the voice stream, where m₁ is greater than a first multiple of 1/e,*
8 *and e is an error percentage rate not to be exceeded.*

1 X The apparatus of claim 6, wherein said message of the first message type to
2 be transmitted in accordance with said second protocol is an acknowledgement
3 message.

1 8. The apparatus of claim 6, wherein said logic further not dropping a message
2 of the voice stream in favor of a message of a second message type to be
3 transmitted in accordance with said second protocol until at least m_2 messages
4 have been successfully transmitted consecutively for the voice stream, where m_2 is
5 greater than a second multiple of $1/e$, which is greater than m_1 .

1 9. The apparatus of claim 8, wherein said message of the second message type
2 to be transmitted in accordance with said second protocol is a data message.

1 10. The apparatus of claim 8, wherein said at least one controller manager is
2 further equipped with logic to reset a message transmitted counter corresponding to
3 a voice stream when a message of the voice stream is dropped after at least m_1/m_2
4 messages have been successfully transmitted consecutively for the voice stream.

1 11. The apparatus of claim 1, wherein the first and the second protocol are two
2 protocols selected from a group consisting of Bluetooth, 802.11 frequency hopping,
3 802.11 direct sequence, 802.11a, 802.11b, and Home RF.

1 12. The apparatus of claim 1, wherein the apparatus is a computer having a form
2 factor selected from a group consisting of a desktop type, a notebook type and a
3 palm sized type.

1 13. *In an apparatus having at least one wireless transceiver and at least one*
2 *controller manager, a method of operation comprising:*
3 *controlling said at least one wireless transceiver to transmit and receive*
4 *signals in accordance with a first protocol to and from first network devices of a first*
5 *wireless network; and*
6 *controlling said at least one wireless transceiver to transmit and receive*
7 *signals in accordance with a second protocol to and from second network devices of*
8 *a second wireless network;*
9 *wherein both of said controlling are performed in a coordinated manner,*
10 *including taking into consideration quality of service criteria to be achieved for the*
11 *respective protocols.*

1 14. *The method of claim 13, said taking into consideration quality of service*
2 *criteria to be achieved for the respective protocols comprises determining message*
3 *types of first messages to be transmitted to a selected one or selected ones of said*
4 *first network devices in accordance with said first protocol, and giving priority to said*
5 *first messages over second messages to be transmitted to a selected one or*
6 *selected ones of said second network devices in accordance with said second*
7 *protocol, if message types of said first messages are determined of a multi-media*
8 *type.*

1 15. *The method of claim 13, wherein said taking into consideration quality of*
2 *service criteria to be achieved for the respective protocols comprises maintaining a*
3 *quality metric reflective of frequency of error for each voice stream, and making*
4 *priority determination for messages competing to be transmitted to said first and*

5 second network devices in accordance with said first and second protocols in view
6 of said quality metric maintained for each voice stream.

1 16. The method of claim 15, wherein said taking into consideration quality of
2 service criteria to be achieved for the respective protocols comprises incrementing a
3 message transmitted counter corresponding to a voice stream whenever a message
4 is transmitted for the voice stream, and not dropping a message of the voice stream
5 until at least m messages have been successfully transmitted consecutively for the
6 voice stream, where m is greater than $1/e$, and e is an error percentage rate not to
7 be exceeded.

1 17. The method of claim 16, wherein said taking into consideration quality of
2 service criteria to be achieved for the respective protocols comprises resetting a
3 message transmitted counter corresponding to a voice stream when a message of
4 the voice stream is dropped after at least m messages have been successfully
5 transmitted consecutively for the voice stream.

1 18. The method of claim 15, wherein said taking into consideration quality of
2 service criteria to be achieved for the respective protocols comprises incrementing a
3 message transmitted counter corresponding to a voice stream whenever a message
4 is transmitted for the voice stream in accordance with said first protocol, and not
5 dropping a message of the voice stream in favor of a message of a first message
6 type to be transmitted in accordance with said second protocol until at least m_1
7 messages have been successfully transmitted consecutively for the voice stream,
8 where m_1 is greater than a first multiple of $1/e$, and e is an error percentage rate not
9 to be exceeded.

1 19. *The method of claim 18, wherein said message of the first message type to*
2 *be transmitted in accordance with said second protocol is an acknowledgement*
3 *message.*

1 20. *The method of claim 18, wherein said taking into consideration quality of*
2 *service criteria to be achieved for the respective protocols further comprises not*
3 *dropping a message of the voice stream in favor of a message of a second*
4 *message type to be transmitted in accordance with said second protocol until at*
5 *least m_2 messages have been successfully transmitted consecutively for the voice*
6 *stream, where m_2 is greater than a second multiple of $1/e$, which is greater than m_1 .*

1 21. *The method of claim 20, wherein said message of the second message type*
2 *to be transmitted in accordance with said second protocol is a data message.*

1 22. *The method of claim 20, wherein said taking into consideration quality of*
2 *service criteria to be achieved for the respective protocols further comprises*
3 *resetting a message transmitted counter corresponding to a voice stream when a*
4 *message of the voice stream is dropped after at least m_1/m_2 messages have been*
5 *successfully transmitted consecutively for the voice stream.*

1 23. *A collection of networked apparatuses comprising:*
2 *a first plurality of apparatuses wirelessly networked together, with each*
3 *apparatus being equipped to communicate wirelessly in accordance with a first*
4 *protocol;*

5 *a second plurality of apparatuses wirelessly networked together, with each*
6 *apparatus being equipped to communicate wirelessly in accordance with a second*
7 *protocol; and*
8 *a multi-protocol apparatus equipped to communicate wirelessly with said first*
9 *and second plurality of apparatuses in accordance with said first and second*
10 *protocols respectively, in a coordinated manner, including having been equipped to*
11 *take into consideration quality of service criteria to be achieved for the respective*
12 *protocols..*

1 24. *The apparatuses of claim 23, wherein said multi-protocol apparatus is*
2 *equipped with logic to determine message types of first messages to be transmitted*
3 *to a selected one or selected ones of said first network devices in accordance with*
4 *said first protocol, and to give priority to said first messages over second messages*
5 *to be transmitted to a selected one or selected ones of said second network devices*
6 *in accordance with said second protocol, if message types of said first messages*
7 *are determined of a multi-media type.*

1 25. *The apparatuses of claim 23, wherein said multi-protocol apparatus is*
2 *equipped with logic to maintain a quality metric reflective of frequency of error for*
3 *each voice stream, and to make its priority determination for messages competing to*
4 *be transmitted to said first and second network devices in accordance with said first*
5 *and second protocols in view of said quality metric maintained for each voice*
6 *stream.*

1 26. *The apparatuses of claim 25, wherein said multi-protocol apparatus is*
2 *equipped with logic to increment a message transmitted counter corresponding to a*

3 *voice stream whenever a message is transmitted for the voice stream, and not*
4 *dropping a message of the voice stream until at least m messages have been*
5 *successfully transmitted consecutively for the voice stream, where m is greater than*
6 *1/e, and e is an error percentage rate not to be exceeded.*

1 27. *The apparatuses of claim 26, wherein said multi-protocol apparatus is further*
2 *equipped with logic to reset a message transmitted counter corresponding to a voice*
3 *stream when a message of the voice stream is dropped after at least m messages*
4 *have been successfully transmitted consecutively for the voice stream.*

1 28. *The apparatuses of claim 25, wherein said multi-protocol apparatus is*
2 *equipped with logic to increment a message transmitted counter corresponding to a*
3 *voice stream whenever a message is transmitted for the voice stream in accordance*
4 *with said first protocol, and not dropping a message of the voice stream in favor of a*
5 *message of a first message type to be transmitted in accordance with said second*
6 *protocol until at least m1 messages have been successfully transmitted*
7 *consecutively for the voice stream, where m1 is greater than a first multiple of 1/e,*
8 *and e is an error percentage rate not to be exceeded.*

1 29. *The apparatuses of claim 28, wherein said message of the first message type*
2 *to be transmitted in accordance with said second protocol is an acknowledgement*
3 *message.*

1 30. *The apparatuses of claim 28, wherein said logic further not dropping a*
2 *message of the voice stream in favor of a message of a second message type to be*
3 *transmitted in accordance with said second protocol until at least m2 messages*

4 ~~have been successfully transmitted consecutively for the voice stream, where m2 is~~
5 ~~greater than a second multiple of 1/e, which is greater than m1.~~

1 31. ~~The apparatuses of claim 30, wherein said message of the second message~~
2 ~~type to be transmitted in accordance with said second protocol is a data message.~~

1 32. ~~The apparatuses of claim 30, wherein said multi-protocol apparatus is further~~
2 ~~equipped with logic to reset a message transmitted counter corresponding to a voice~~
3 ~~stream when a message of the voice stream is dropped after at least m1/m2~~
4 ~~messages have been successfully transmitted consecutively for the voice stream.~~

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